



PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS AND INTERFERENCES**

Application No. : 10/572,953
Applicant : Dietmar Birgel
Filed : February 21, 2007
Title : CIRCUIT BOARD WITH A HOLDING MECHANISM.....
TC/A.U. : 2833
Examiner : T.S. Chambers
Docket No. : BIRG3005 /FJD
Customer No. : 23364

Confirmation No.: 4797

BRIEF ON APPEAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22202-3514

Sir:

INTRODUCTORY COMMENTS

Pursuant to the provisions of 37 CFR 41.37, submitted herewith is Applicant/Appellant's Brief on Appeal along with the required fee.

Any additional fees necessary for this appeal may be charged to the undersigned's Deposit Account No. 02-0200.

REAL PARTY IN INTEREST

(37 CFR 41.37(c)(1)(i))

The real party in interest is Applicant/Appellant's assignee Endress + Hauser GmbH . The assignment was recorded on February 21, 2007 at Reel 018985 and Frame 0498.

RELATED APPEALS AND INTERFERENCES

(37 CFR 41.37(c)(1)(ii))

There are no related appeals or interferences with respect to the invention defined in this application.

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STATUS OF CLAIMS

(37 CFR 41.37(c)(1)(iii))

Claims 1 - 29 were cancelled and replaced with claims 30 - 58 by the Preliminary Amendment filed on March 21, 2006;

Claims 44 - 52 and 56 - 58 were elected in response to a restriction requirement;

Claims 44 - 49 and 56 - 58 were cancelled; and

Claims 50 - 52 were finally rejected and form the basis for this appeal.

STATUS OF AMENDMENTS

(37 CFR 41.37(c)(1)(iv))

No amendment was filed after issuance of the Office Action of April 7, 2009, which presented a final rejection of claims 50 - 52.

SUMMARY OF CLAIMED SUBJECT MATTER

(37 CFR 41.37 (c)(1)(v))

(References are to page and line of the specification)

The claims on appeal are, as noted above, claims 50 - 52. These claims are each formulated in independent form. Each claim defines a method for manufacturing a circuit board having at least one connection bore for receiving a connection wire, or pin, of an electronic component of a predetermined wire, or pin, diameter (page 1, line 6 and 7, and page 2, lines 22 - 25). The steps defined in **claim 50** include a first step of manufacturing a circuit board with at least one ply or layer (page 3, line 31); the board is drilled to have a blind hole at a location desired for a connection bore (page 3, lines 32 - 35); The blind bore is then drilled , through the floor of the blind hole with a tool which has a diameter smaller than the wire of pine diameter in order to form a second bore so that a narrowing created thereby in the cross section of a part of the connection bore forms a holding mechanism for secure holding of the connection wire or pin (page 3, line 36, 37 to page 4, lines 1 - 5).

Claim 51, defines the method as defined in claim 50 except that the two holes are drilled from a first surface and a second surface , respectively, and the two holes

are offset, and because of the offset a restriction is formed which represents a holding mechanism for secure holding of the connection wire, or pin (page 6, lines 4 - 9).

Claim 52, defines the method as defined in claim 50 except that the two holes are drilled from a first surface and a second surface, respectively, and the two holes are aligned with each other but they do not extend completely into each other, so that, in a portion of the connection bore, where the two blind holes meet one another, a restriction is formed, which represents a holding mechanism for secure holding of the connection wire, or pin (page 6, lines 22 - 31).

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

(37 CFR 41.37(c)(1)(vi))

The Office Action of April 7, 2009 presents two final rejections. These are:

(1) the final rejection of claims 50 and 52 under 35 USC 102(b) by Belke, Jr. Et al; and

(2) the final rejection of claim 51 under 35 USC 103(a) by Kokubun et al in view of Machida.

ARGUMENTS

(37 CFR 41.37(c)(1)(vii))

(1)

The first issue for consideration involves the final rejection of claims 50 and 52 under 35 USC 102(b) by Belke, Jr. et al. This rejection was during prosecution, and is in this appeal, respectfully traversed.

It is well settled law, that for a single reference to anticipate (35 USC 102) a claim in a patent application, that single reference must include in its disclosure each and every positively recited structural element (apparatus) or step (method) in the claim, *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990), as an example only.

Claim 50 relates to a connection hole for receiving a connection wire relates to a connection hole for receiving a connection wire, or pin, of an electronic component and to restriction that represents a holding mechanism for the secure holding of the pin or wire in the hole. Such a holding mechanism is an essential feature of the claimed invention. In contrast, Belke Jr. et al teaches a hole or an aperture in a printed circuit board that serves to provide space for an enhanced "interconnection" of a solder bridge connecting the desired internal conductive layers of the printed circuit board (see column 1, lines 40-55 of Belke, Jr., et al). Belke J., et al's aim is to optimize the wetting of the material forming the final interconnecting bridge (see column 5, lines 1-17 e.g.). In figures 2-13 of Belke, Jr., et al, there are illustrated various embodiments of the internal geometry of apertures or holes that are intended to receive a bulb type of solder for providing the desired interconnections of internal layers. Belke, Jr., et al. is silent in regard to any pin or wire placed in the holes or apertures. Furthermore Belke, Jr., et al. does not teach any holding mechanism for providing a secure holding for a pin or wire, because there is no pin or wire in the apertures according to Belke, Jr. et al.

In view of this clear teaching in Belke, Jr. et al , it is difficult to see a basis for the examiner's position that the "secure holding" is given only "little patentable weight". One can understand this position if the reference to a wire or pin in claim 50 is ignored .. However, It should not be ignored; and it appears rather conclusive from the Belke, Jr. et al teaching that Belke, Jr. et al has nothing to do with a wire or pin, so that the method of claim 50, which is aimed at manufacturing a circuit board "for receiving a connection wire, or pin .." cannot be anticipated by Belke, Jr. et al.

The examiner states in his "Response to Arguments" that "Applicant did not positively claim the connection wire or pin." How is a structural element (wire or pin) to be claimed in a method claim? It is sufficient if it is recited to lend meaning to the steps of the method being claimed.. To specifically state, as is done in claim 50, for example, that the "circuit board" has "at least one connection bore for receiving a connection wire, or pin.." should be sufficient.

When considering the "all elements rule" of *In re Bond*, one must conclude that

Belke ,Jr. et al does not provide a sufficient teaching to anticipate claim 50. It cannot be overemphasized that the connecting wire or pin should not be ignored, not because they are positively recited steps but because they lend meaning to the positively recited steps. If they are ignored, then the invention examined is not the invention intended by applicant. It is broader, and that is not the function of a proper examination. It is the inventor who defines the invention, not the examiner. Why not examine the invention defined by the inventor?

The same can be said for claim 52.

(2)

The second issue for consideration involves the final rejection of claim 51 under 35 USC 103(a) by Kokubun et al in view of Machida. This rejection was during prosecution, and is in this appeal, respectfully traversed.

With respect to the rejection of claim 51 under 35 USC 103(a) over Kokubun et al in view of Machida, it is noted that Machida describes a particular "thin electric circuit layer" which corresponds to the foil of cancelled claims 44-47. Kokobun et al describe a method for forming a through hole electrically connecting two sides of a flexible multilayer circuit board (see section "Technical Field" of Kokobun et al). The through hole is formed by two external holes in external layers which holes are arranged to have a certain offset to each other and by an internal layer with a preformed hole, which internal layer is located between the two external layers.

Kokobun et al describe in claim 1 and the related specifications text (see column 3, lines 33-60) that the two external holes are drilled by a laser through external layers whereby the laser radiation is blocked by the internal layer. In order to allow for a real through hole through the circuit board the internal layer has a pre-made hole. If the internal layer blocks the laser it must have a pre-manufactured hole otherwise there would be no through hole through the circuit board. The pre-made hole in the internal layer defines the real through hole diameter which in turn is smaller than the holes in

the two external layers (see Column 3, line 60 bridging to column 4, line 12 and claims 2-3 of Kokobun et al). This is totally different from the subject matter of pending claim 51. First, the circuit board according to Kokobun et al requires multiple layers. The circuit board according to pending claim 51 may even consist of a single layer. Secondly, Kokobun et al only describe "through holes" in the layers to form the final "stepped" through hole, whereby claim 51 claims blind holes to finally form the through hole. Thirdly, the final hole through the circuit board of Kokobun et al has nothing to do with holding or securing connection pins or wires of wired components, and is silent in regard to any pin or wire placed in the holes or apertures. Kokobun et al do not teach any holding mechanism for a secure holding of a pin or wire, because there is no pin or wire in the apertures described by Kokobun et al. The "secure holding" of pins or wires is important for the subject matter of claim 51 and should not to be neglected.

The examiner cites Machida in view of Kokobun et al in order to combine the secure holding effect of the foil according to Machida with the particular geometry of the through hole according to Kokobun et al. The examiner's arguing that "secure holding" of pins or wires is given only "little patentable weight" should, as noted above, be dismissed. Combining Machida and Kokobun et al does not lead to the subject matter of claim 51. Neither does Machida suggest combining the wire securing foil with a through hole according to Kokobun et al. And, moreover, Kokobun et al does not contemplate a securing device for a pin or wire. Combining a foil according to Machida with the circuit board of Kokobun et al would enhance the number of layers of the resulting circuit board and bring it further away from the board according to pending claim 51. Thus, the subject matter of claim 51 can not be obvious to the skilled person even when Machida and Kokobun et al are combined ..

Holes which are used in conjunction with insulating layers 1 and 3 in Kokobun et al is not to be compared to holes used for connecting wires or pins. There is no similarity, and the problems dealt with with one do not necessarily translate to the other. Again the recitation of the wires or pins should not be ignored under any section of 35 USC.


CONCLUSION

In view of the above, it is respectfully submitted that the final rejections of claims 50 - 52 should be reversed and claims 50 — 52 allowed over the references of record and those applied.

Date: February 12, 2010

Respectfully submitted

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APPENDIX OF CLAIMS
(37 CFR 41.37 (c)(1)(viii))

Claims 1 - 29 (Cancelled).

30. (Withdrawn) A circuit board having:
at least one connection bore for receiving a connection wire, or pin, of an electronic component of a predetermined wire, or pin, diameter; and
a holding mechanism in the form of a narrowing in said at least one connection bore to a diameter which is smaller than that of the connection wire, or pin for the purpose of providing a secure holding of the connection wire or pin.

31. (Withdrawn) The circuit board as claimed in claim 30, wherein:
said narrowing is brought about by a foil.

32. (Withdrawn) The circuit board as claimed in claim 31, wherein:
said foil narrowing the cross section of said connection bore is arranged on a surface of the circuit board.

33. (Withdrawn) The circuit board as claimed in claim 31, wherein:
the circuit board is a multi-ply circuit board and that said foil narrowing the cross section of said connection bore is an inner ply of the circuit board.

34. (Withdrawn) The circuit board as claimed in claim 31, wherein:
said foil is slit in the area of said connection bore.

35. (Withdrawn) The circuit board as claimed in claim 31, wherein:
said foil is provided with a hole in the area of said connection bore.
36. (Withdrawn) The circuit board as claimed in claim 31, wherein:
said foil comprises an electrically conductive material.
37. (Withdrawn) The circuit board as claimed in claim 31, wherein:
said foil comprises an insulating, electrically non-conducting material.
38. (New) The circuit board as claimed in claim 30, wherein:
said narrowing is brought about by a unilateral bore, which is not
completely traversing.
39. (Withdrawn) The circuit board as claimed in claim 30, wherein:
said narrowing is brought about by a beaker-shaped shell provided with a
restriction and situated in a traversing bore.
40. (Withdrawn) The circuit board as claimed in claim 30, wherein:
said narrowing is brought about by two bores.
41. (Withdrawn) The circuit board as claimed in claim 40, wherein:
said narrowing is brought about by two equally directed bores having
different diameters.
42. (Withdrawn) The circuit board as claimed in claim 40, wherein:
said narrowing is brought about by two oppositely directed bores
43. (Withdrawn) The circuit board as claimed in claim 42, wherein:
said narrowing is brought about by two oppositely directed bores, which are
offset relative to one another.

Claims 44 -49 (Cancelled)

50. (Previously presented) A method for manufacturing a circuit board having at least one connection bore for receiving a connection wire, or pin, of an electronic component of a predetermined wire, or pin, diameter, comprising the steps of:

manufacturing a circuit board with at least one ply, or layer;

drilling a blind hole with a drilling tool having a desired diameter, into the circuit board at a location desired for the connection bore; and

drilling through the floor of the blind hole with a drilling tool having a diameter smaller than the wire, or pin, diameter, in order to form a second bore, so that a narrowing created thereby in the cross section of a part of the connection bore forms a holding mechanism for secure holding of the connection wire, or pin.


51. (Previously presented) A method for manufacturing a circuit board having at least one connection bore for receiving a connection wire, or pin, of an electronic component of a predetermined wire, or pin, diameter, comprising the steps of:

manufacturing a circuit board with at least one ply, or layer;

drilling a first blind hole at a location desired for the connection bore, into the circuit board from a first surface of the circuit board with a drilling tool of a desired diameter; and

drilling a second blind hole from a second surface of the circuit board, into the circuit board, which is arranged slightly offset from the first blind hole and which meets the first blind hole, so that, by the offset of the two blind holes relative to one another, a restriction is formed, which represents a holding mechanism for secure holding of the connection wire, or pin.

52. (Previously presented) A method for manufacturing a circuit board



having at least one connection bore for receiving a connection wire, or pin, of an electronic component of a predetermined wire, or pin, diameter, comprising the steps of:

- manufacturing a circuit board with at least one ply, or layer;

- drilling a first blind hole, at a location desired for the connection bore, into the circuit board from a first surface of the circuit board with a drilling tool of a desired diameter; and

- drilling a second blind bore from a second surface of the circuit board, into the circuit board a second, which is arranged essentially axially parallel and aligned with the first blind hole and which meets the first blind hole but does not extend completely into it, so that, in a portion of the connection bore, where the two blind holes meet one another, a restriction is formed, which represents a holding mechanism for secure holding of the connection wire, or pin.

53. (Withdrawn) The use of a circuit board as claimed in claim 30 with at least one electronic component held in the connection bore by means of the holding mechanism for soldering the component in a reflow soldering oven.

54. (Withdrawn) The use of a circuit board as claimed in claim 53 for a soldering method, in which the component is soldered hanging below the circuit board in a reflow soldering oven.

55. (Withdrawn) The use of a circuit board as claimed in claim 30, with at least one electronic component held in the connection bore by means of a holding mechanism for soldering the component in a wave soldering facility.

Claims 56 - 58 (cancelled)

EVIDENCE APPENDIX

There is no evidence being relied upon which was submitted pursuant to 37 CFR 1.130, 1.131 or 1.132.



RELATED PROCEEDINGS APPENDIX

There is no related proceeding being relied upon.

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